

ABSTRACT

A method and apparatus for the data-driven synchronous parallel processing of digital data, which temporally separates the processes of instructions distributions and data requests from the process of actual data processing. The method includes the steps of: dividing the stream of digital data into data packets, consecutively distributing instructions to data processing units before their execution, consecutively synchronously processing data packets by multiple data processing units processing in parallel, and synchronization of parallel multiple data processing units by data tokens attached to the data packets. In the preferred embodiment the method comprises one or more of the steps of: storing instructions inside the data processing units, requesting data before the start of data processing, storing records for requested data packets, associating received data with the records of data requests, attaching to each data packet a validity signal (data token) indicating the validity or non-validity of the received data for processing, and extension of data buffers coupled to the data processing units into elastic data buffers capable of absorbing variations in the data rate. The method provides a data-driven synchronization of parallel synchronous multiprocessor system and a substantially non-stalling flow of digital data through a digital data processor, and the apparatus includes a programmable apparatus which implements the method. In the preferred embodiment a data buffer is provided between adjacent data handling units, and the invention manipulates the timing of the buffer's emptiness and fullness signals, processing each data packet coming into buffer in accordance with its validity signal (data token), and associating a validity signal (data token) with the data packet sent out from buffer.